Civil engineers judiciously apply their knowledge of mathematics and physical sciences to improve and protect the environment and to provide facilities and structures for community living, industry, and transportation. Civil engineering encompasses several disciplines, including structural engineering, environmental engineering, transportation planning and engineering, and geotechnical engineering. Civil engineers supervise the construction of bridges, tunnels, buildings, dams, and aqueducts. They also plan, design, construct, and manage highways, railroads, canals, and airports; regulate rivers and control floods; and design and build systems for water distribution, wastewater treatment, waste disposal, and environmental remediation.

The civil engineering program has four educational objectives. The first is that our students gain an understanding of the natural and cultural world. Mathematics, physics, and chemistry are the foundation of civil engineering. Such a foundation is designed to enable students to properly understand and apply engineering principles and makes the Northeastern education one that can keep pace with the advances in this dynamic field. Likewise, it is important for students to understand the historical and cultural context in which engineering takes place and to understand the social and environmental impacts of engineering projects.

The second objective is that our students become technically prepared for engineering practice. Students are exposed to a common base of knowledge in the engineering sciences, including mechanics and environmental science. In more advanced courses, students have an opportunity to learn to analyze and design building frames and bridges, water and wastewater treatment systems, highways and traffic systems, hydraulic systems, earth dams, building foundations, and construction management systems. Our program is designed to give students proficiency in at least four areas of civil engineering.

The third program objective is that our students develop skills in critical thinking, communication, information literacy, and aesthetics. These subjects are integrated into courses throughout the program. Particular emphasis is placed on the importance of effective writing and public speaking.

The fourth program objective is that our students develop a personal and professional ethic—that is, an understanding of the profession, its ethical codes, history, contemporary issues, and the need for lifelong learning. Course work, cooperative education, and participation in the activities of the award-winning student chapter of the American Society of Civil Engineers help students meet this goal.

The civil engineering program is designed to provide students with a broad education appropriate for a variety of career choices and lifelong learning. Experience tells us that civil engineering graduates will enter almost every field imaginable. The knowledge and skills acquired—understanding science, critical thinking, effective communication, and understanding the social context, among them—form an excellent foundation for a host of careers, as well as for a fulfilling life outside the world of work. The civil engineering program has been designed with four general electives that permit students to explore or acquire further depth in other fields of interest. Students can use these electives to earn a minor in business, architectural history, music, computer science, or any number of other fields.

The co-op program parallels the academic program in level of responsibility and sophistication. A beginning job might involve layout at a construction site or laboratory testing; in senior-level co-op assignments, students are often working alongside engineers on design teams.

BSCE—Bachelor of Science in Civil Engineering

MATHEMATICS/SCIENCE REQUIREMENT

Complete 34 semester hours in mathematics and science as indicated below.

Required Mathematics/Science

Complete each of the following courses with corresponding labs as indicated:

- CHM U151 General Chemistry for Engineers 4 SH
- MTH U241 Calculus 1 for Science and Engineering 4 SH
- MTH U242 Calculus 2 for Science and Engineering 4 SH
- MTH U341 Calculus 3 for Science and Engineering 4 SH
- MTH U343 Differential Equations and Linear Algebra for Engineering 4 SH
- PHY U151 Physics for Engineering 1 4 SH with PHY U152 Lab for PHY U151 1 SH
- PHY U155 Physics for Engineering 2 4 SH with PHY U156 Lab for PHY U155 1 SH

Further Credit

3 semester hours from the following course count toward the mathematics/science requirement:

- CIV U464 Probability and Engineering Economy 4 SH for Civil Engineering

1 semester hour from the following course counts toward the mathematics/science requirement:

- GE U111 Engineering Problem Solving 4 SH and Computation
ENGINEERING REQUIREMENT
Complete 56 semester hours in engineering as indicated below.

Required Engineering
Complete each of the following courses with corresponding labs as indicated:
- CIV U221 Statics and Strength of Materials 4 SH
- CIV U260 Civil Engineering Materials 3 SH
  with CIV U261 Materials and Measurements Lab 2 SH
- CIV U320 Structural Analysis 1 4 SH
- CIV U324 Reinforced Concrete Design 4 SH
- CIV U331 Fluid Mechanics 4 SH
- CIV U334 Environmental Engineering 1 4 SH
- CIV U340 Soil Mechanics 4 SH
  with CIV U341 Lab for CIV U340 1 SH

Senior Design Project
Complete one of the following courses:
- CIV U765 Senior Design Project—Environmental 5 SH
- CIV U766 Senior Design Project—Geotechnical 5 SH
- CIV U767 Senior Design Project—Structural 5 SH
- CIV U768 Senior Design Project—Transportation 5 SH

Civil Engineering Project Elective
Complete one of the following courses:
- CIV U536 Hydrologic Engineering 4 SH
- CIV U542 Foundation Engineering 4 SH
- CIV U554 Highway Engineering 4 SH

Civil Engineering Technical Electives
Complete 11 semester hours from the following list:
- CIV U425 Steel Design 4 SH
- CIV U522 Structural Analysis 2 4 SH
- CIV U534 Environmental Engineering 2 3 SH
- CIV U536 Hydrologic Engineering 4 SH
- CIV U542 Foundation Engineering 4 SH
- CIV U545 Geoenvironmental Engineering 4 SH
- CIV U553 Transport Analysis and Planning 4 SH
- CIV U554 Highway Engineering 4 SH
- CIV U556 Traffic Engineering 4 SH
- CIV U575 Construction Management 3 SH

Further Credit
3 semester hours from the following course count toward the engineering requirement:
- GE U110 Engineering Design 4 SH

2 semester hours from the following course count toward the engineering requirement:
- GE U111 Engineering Problem Solving and Computation 4 SH

1 semester hour from the following course counts toward the engineering requirement:
- CIV U464 Probability and Engineering Economy 4 SH
  for Civil Engineering

GENERAL EDUCATION ELECTIVE
Arts/Humanities Level 1
Complete 4 semester hours from the NU Core arts/humanities level 1 domain, as described on page 42.

GENERAL ELECTIVES
Complete five 4-SH-equivalent academic, nonremedial, nonrepetitive courses.

OTHER REQUIRED COURSE WORK
Complete 21 semester hours as indicated below.

Writing
Complete the following two courses with a grade of C or higher in each course:
- ENG U111 College Writing 4 SH
- ENG U302 Advanced Writing 4 SH
  in the Technical Professions

Macroeconomics or Microeconomics
Complete one of the following courses:
- ECN U115 Principles of Macroeconomics 4 SH
- ECN U116 Principles of Microeconomics 4 SH

Mathematics/Science Elective
Complete one of the following courses:
- BIO U121 Basic Microbiology 4 SH
- BIO U151 Introduction to Marine Biology 4 SH
- CHM U311 Organic Chemistry 1 4 SH
- CHM U321 Analytical Chemistry 4 SH
- CHM U401 Physical Chemistry 1 4 SH
- CHM U403 Physical Chemistry 2 4 SH
- ECE U400 Linear Circuits 4 SH
- ECE U694 Numerical Methods and Computer Applications 4 SH
- ENV U400 Field Geology 4 SH
- ENV U410 Environmental Geochemistry 4 SH
- ENV U418 Geophysics 4 SH
- ENV U435 Introduction to Remote Sensing 4 SH
- ENV U448 Marine Geology 4 SH
- ENV U455 Wetlands 4 SH
- ENV U460 Geographic Information Systems 4 SH
- ENV U582 Groundwater Geochemistry 4 SH
- MIM U380 Thermodynamics 4 SH
- MIM U455 Dynamics and Vibrations 4 SH
- MIM U515 Operations Research 4 SH
- MIM U520 Stochastic Modeling 4 SH
- MTH U481 Probability and Statistics 4 SH
- MTH U530 Numerical Analysis 4 SH
- MTH U532 Numerical Solutions of Differential Equations 4 SH
- MTH U581 Statistics and Stochastic Processes 4 SH
- PHY U303 Modern Physics 4 SH
- PHY U401 Classical Dynamics 4 SH
- PHY U402 Electricity and Magnetism 4 SH
- PHY U611 Astrophysics and Cosmology 4 SH
Professional Development
Complete the following three courses:

- GE U100 Introduction to the Study of Engineering 1 SH
- CIV U300 Introduction to Engineering Co-op Education 1 SH
- CIV U500 Professional Issues in Engineering 1 SH

Further Credit
1 semester hour from each of the following courses counts toward other required course work:

- GE U110 Engineering Design 4 SH
- GE U111 Engineering Problem Solving and Computation 4 SH

Residency Requirement
32 of the final 40 semester hours must be taken at Northeastern University.

Major GPA Requirement
2.000 minimum GPA required in CIV courses

NU Core Requirements
See page 42 for requirement list.

General Electives
Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

Cooperative Education

University-Wide Requirements
135 total semester hours required
Minimum 2.000 GPA required